

REMARKS

This is in response to the Office Action mailed on October 19, 2004. Pending in the present application are claims 1-17 and 21-24. In the Office Action, claims 1-4, 6-8, 21, and 22 were rejected over the prior art; claims 1-17 and 21-24 were rejected under the judicially-created doctrine of double patenting; claims 5, 23, and 24 were indicated to be allowable if rewritten in independent form; and claims 9-17 were allowed. With this Amendment, claim 1 is amended and claims 2 and 5 are canceled without prejudice. Applicant believes the present application containing claims 1, 3, 4, 6-17 and 21-24 is in condition for allowance, and respectfully requests reconsideration and notice to that effect.

Interview Summary

On October 15, 2004, Applicant, through its attorney Dina M. Khaled, declined Examiner Paul Ip's proposal to amend independent claims 1 and 21 to include the elements of a respective one of dependent claims 5 and 23.

Claims 1-4 and 6-8

In the Office Action, claims 1-4 and 6-8 were rejected under 35 U.S.C. § 102(a) as being anticipated by Sakai et al., U.S. Patent No. 6,674,258 ("Sakai"), and 35 U.S.C. § 102(e) as being anticipated by Inao et al., U.S. Patent Application Publication No. 2004/0000884 ("Inao"). With this Amendment, claim 1 has been amended to include the elements of dependent claims 2 and 5, the subject matter of which was previously allowed. Accordingly, this rejection is overcome and should be withdrawn.

Claims 21-24

The Office Action also rejects claims 21-24 as being anticipated by Sakai under 35 U.S.C. § 102(a) and Inao under 35 U.S.C. § 102(e). Independent claim 21 and its dependent claims 22-24 are each directed toward a motor controller for an electric motor having a plurality of motor terminals. The motor controller includes a plurality of motor drivers connected to the motor terminals. Sequencer logic commutates the motor by providing control signals to the motor drivers to drive a first of the motor terminals to a high voltage, drive a second of the motor terminals to an intermediate voltage, and alternately

drive a third of the motor terminals between the high voltage and a low voltage. The motor controller further includes a reverse current control for driving the third motor terminal to the low voltage upon the occurrence of a high side commutation (defined by a first terminal transitioning from an intermediate voltage to a high voltage, a second terminal transitioning from a high voltage to an intermediate voltage, and a third terminal being pulse width modulated).

The motor controller Sakai and Inao does not commutate the motor as required by claim 21. Sakai and Inao teach a method and a circuit for sinking and sourcing current through the phases to prevent sharp changes in current through each phase of the commutated electric motor. (Sakai col. 8:5-29; Inao ¶¶ 54-55). According to this method and circuit, two terminals are pulse width modulated to slowly transition between voltages, while a third terminal is held constant at either a high or a low voltage. (Sakai Fig. 2 and col. 8:5-29; Inao Fig. 2 and ¶¶ 54-55). Accordingly, Sakai and Inao do not teach or suggest the sequencer logic of claim 21 for commutating the motor by providing control signals to the motor drivers to drive a first of the motor terminals to a high voltage, drive a second of the motor terminals to an intermediate voltage, and alternately drive a third of the motor terminals between the high voltage and a low voltage. Further, because of this different commutation technique which avoids the high side commutation problem addressed by the present application, it would be nonsensical for Sakai and Inao to include reverse current control for driving the third motor terminal to the low voltage upon the occurrence of a high side commutation. Because Sakai and Inao do not teach or suggest the invention of claims 21-24, this rejection should be withdrawn.

Double Patenting

Finally, the Office Action rejected claims 1-17 and 21-24 under the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1-19 of Brenden et al., U.S. Patent No. 6,597,134 ("Brenden"). "In determining whether a nonstatutory basis exists for a double patenting rejection, the first question to be asked is—does any claim in the application define an invention that is merely an obvious variation of an invention claimed in the patent?" M.P.E.P. § 804.

Any obviousness-type double patenting rejection should make clear:

(A) The differences between the inventions defined by the conflicting claims – a claim in the patent compared to a claim in the application; and

(B) The reasons why a person of ordinary skill in the art would conclude that the invention defined in the claim in issue is an obvious variation of the invention defined in a claim in the patent.

M.P.E.P. § 804.

The Office Action fails to meet this burden, but instead asserts merely that: "Although the conflicting claims are not identical, they are not patentably distinct from each other because the soft commutation control and the sequence logic recited in the claims produce the same reverse current control and reset control as recited in the claims." This rationale is insufficient proof of an obviousness-type double patenting rejection.

Further, the rationale recited in the Office Action improperly generalizes the scope of the claims of both the present application and the Brenden patent. None of the claims of the current application recite the "reset control" noted in the Office Action. Further, none of the claims of the Brenden patent recite both "soft commutation control and sequence logic" as described in the rejection: claims 1-8 do not recite "sequence logic"; claims 11-16 do not recite "soft commutation control"; and claims 9-10 and 17-19 recite neither "soft commutation control" nor "sequence logic".

Finally, and most importantly, this rejection fails because the inventions claimed in the present application patentably distinguish from the invention claimed in the Brenden patent, which does not teach or suggest the reverse current control. The Brenden patent introduces multi-level peak current limiting for preventing current spikes during the rapid spin up of the spindle motor from a stop condition to normal operating speed. The claims of the Brenden patent do not recite (a) a reverse current control for resetting the pulse generator at the start of each change of commutation state in which a new motor terminal is connected to a high power supply voltage as recited in independent claim 1, (b) the sequencer logic providing a reset signal for preventing reverse current from flowing into the power supply during change

of commutation as recited in independent claim 9, or (c) a reverse current control for driving the third motor terminal to the low voltage upon the occurrence of a high side commutation as recited in independent claim 21. Because the claims of the present application recite non-obvious variations on the inventions of the Brenden patent, this rejection should be withdrawn.

Conclusion

The application containing pending claims 1-17 and 21-24 is in condition for allowance. Reconsideration and notice to that effect is respectfully requested. The Examiner is invited to contact the undersigned at the telephone number listed below if such a call would in any way facilitate allowance of the application.

Respectfully submitted,

KINNEY & LANGE, P.A.

Date:

1/19/05

By:



Alan M. Koenck, Reg. No. 43,724

THE KINNEY & LANGE BUILDING

312 South Third Street

Minneapolis, MN 55415-1002

Telephone: (612) 339-1863

Fax: (612) 339-6580

AMK:DMK:bmg